

Claims

- [c1] 1. A shock-absorbing device for use in footwear, comprising
- 1) a base having an upper surface adapted to confront the bottom surface of a user's foot, and a lower surface adapted to contact a walking surface,
 - 2) a plurality of first projections distributed on and projecting upward from the upper surface, and projecting in a normal direction to the bottom surface of the foot, and
 - 3) a plurality of second projections distributed on and projecting downward from the lower surface;
- wherein the device provides a shock-absorbing system that is activated by the pressure exerted by foot flexion during walking on a walking surface, whereby the first projections are pressed in contact with the bottom of the foot.
- [c2] 2. The shock-absorbing device according to Claim 1, wherein a heel portion comprises a plurality of laterally-aligned and flexible wave-like wall elements, spaced apart by a plurality of laterally-aligned wave-like channels.
- [c3] 3. The shock-absorbing device according to Claim 1,

wherein the first projections are distributed in positions corresponding to the reflex points located in the sole of the foot.

- [c4] 4. The shock-absorbing device according to Claim 1, wherein the first projections have flexibility in a plurality of directions.
- [c5] 5. The shock-absorbing device according to Claim 4, wherein the first projection comprises a plurality of raised members separated by a recess, and a central pin, and the second projection further comprises a circumferential recess that permits elastic movement of the base relative to the second projection in response to an upward displacement of the second projection.
- [c6] 6. The shock-absorbing device according to Claim 1, further comprising a plurality of randomly-positioned pivot elements
- [c7] 7. The shock-absorbing device according to Claim 1, wherein the shock-absorbing device is made from a flexible material, typically selected from a natural or synthetic rubber.
- [c8] 8. The shock-absorbing device according to Claim 1, wherein the flexible material is vapor pervious.

[c9] 9. A footwear article, comprising:

- a) a shock-absorbing device for use in footwear, comprising
 - 1) a base having an upper surface adapted to confront the bottom surface of a user's foot, and a lower surface adapted to contact a walking surface,
 - 2) a plurality of first projections distributed on and projecting upward from the upper surface, and projecting in a normal direction to the bottom surface of the foot, and
 - 3) a plurality of second projections distributed on and projecting downward from the lower surface; wherein the device provides a shock-absorbing system that is activated by the pressure exerted by foot flexion during walking on a walking surface, whereby the first projections are pressed in contact with the bottom of the foot; and
- b) a shoe upper.

[c10] 10. The footwear article according to Claim 9 wherein the first projections are distributed in positions corresponding to the reflex points located in the sole of the foot.

[c11] 11. The shock-absorbing device according to Claim 9, wherein the first projection comprises a plurality of raised members separated by a recess, and a central pin, and the second projection further comprises a circum-

ferential recess that permits elastic movement of the base relative to the second projection in response to an upward displacement of the second projection.

[c12] 12. The shock-absorbing device according to Claim 9, further comprising a plurality of randomly-positioned pivot elements

[c13] 13. The shock-absorbing device according to Claim 9, wherein the shock-absorbing device is made from a flexible material, typically selected from a natural or synthetic rubber.

[c14] 14. The shock-absorbing device according to Claim 9, wherein the flexible material is vapor pervious.

[c15] 15. A shock-absorbing system for footwear, comprising
1) a plurality of first projections distributed on and projecting upwardly from an upper surface, and in contact with and extending substantially in the normal direction to the bottom surface of a user's foot, and
2) a plurality of second projections distributed on and projecting downwardly from a lower surface, and in contact with a walking surface, the second projections having a shape, and a circumferential recess,
wherein the system is activated by pressure exerted on the second projections that, on foot flexion during step-

ping on the walking surface, cause the second projections to yield elastically and to displace and press the first projections into contact with the bottom of the user's foot, thereby achieving a massage action, the shock-absorbing, and the uniform distribution of weight on the foot.

[c16] 16. The shock-absorbing system according to claim 15, further comprising a plurality of wave-like wall elements in a heel portion of the upper surface, having a shape and a cross section that allow flexion and torsion of the foot in the heel portion, following the shape of the walking surface.

[c17] 17. The shock-absorbing system according to Claim 15, wherein the first projections are uniformly distributed positioned on the upper surface.

[c18] 18. The shock-absorbing system according to Claim 15, wherein the first projections are positioned on the upper surface in groups of projections according to the reflex points located in the sole of a user's foot.

[c19] 19. The shock-absorbing system according to Claim 15 wherein the second projections have the same size and geometric shape.

[c20] 20. The shock-absorbing system according to Claim 15,

wherein the system is made from a flexible material that is vapor pervious.